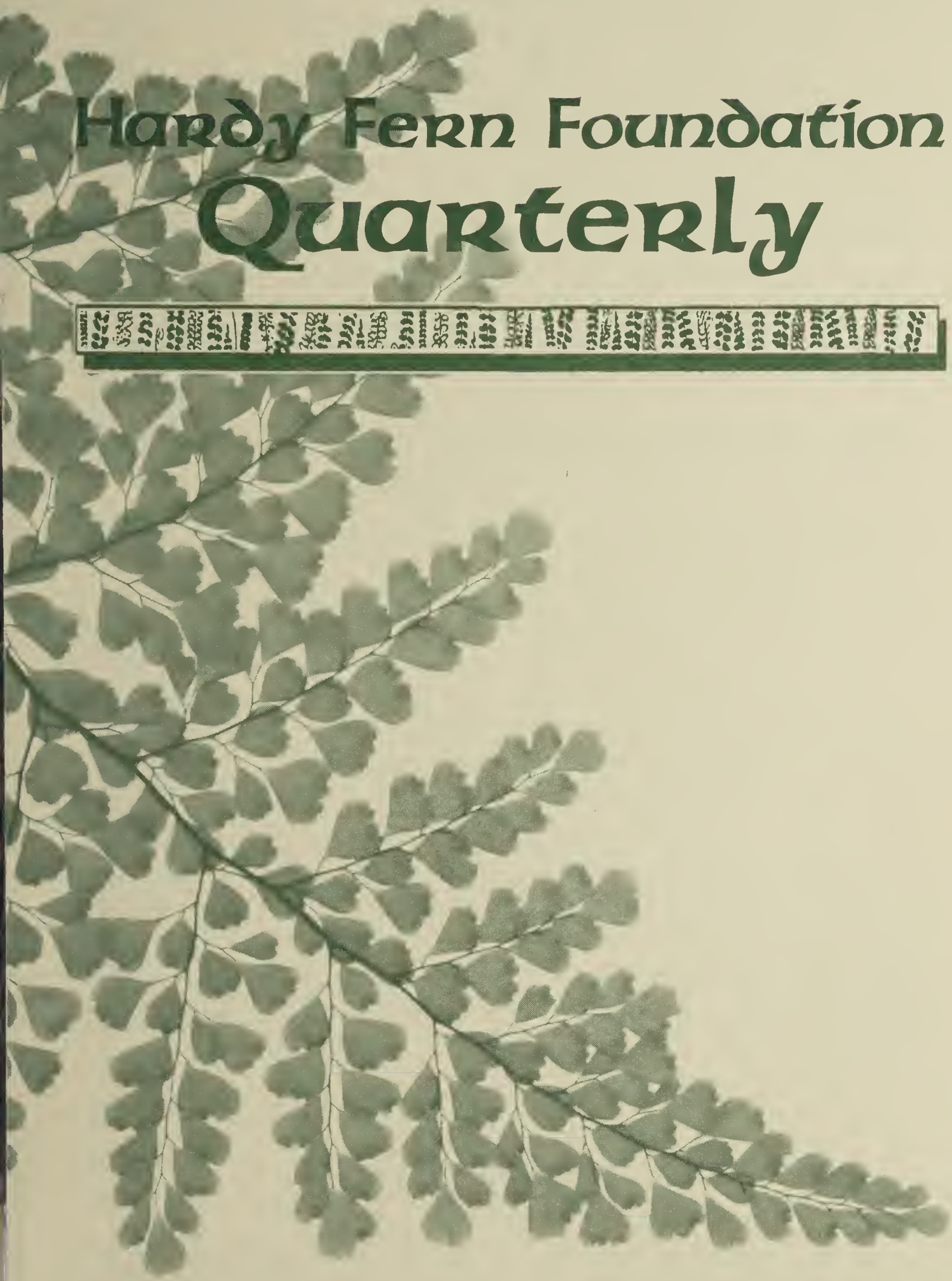
Hardy Fern Foundation Quarterly



THE HARDY FERN FOUNDATION

P.O. Box 166

Medina, WA 98039-0166

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens. Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, Lewis Ginter Botanical Garden, Richmond, Virginia, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover Design by Willanna Bradner

THE HARDY FERN FOUNDATION

QUARTERLY

Volume 12 • No. 4 • Editor - Sue Olsen

The Spore Exchange Needs You!

Please continue to send spores to:

Shannon Toal
9843 41st AVE SW
Seattle, WA 98136

President's Message

Autumn is a time for reassessment and improvement; making note where shortcomings are most apparent and for me to ask, "What if?"

After a long, dry summer I'm facing the daunting task of improving a garden which has slowly evolved – a work in progress. I continue to learn from mistakes and take measures to offset the ravages of late summer. Now is a good time to add that extra mulch (see related article) or relocate certain varieties for more suitable conditions.

This past summer members of the Board of Directors had the opportunity to visit gardens locally and for some in the eastern part of our country as well, an excursion that is well described in Bill Plummer's article.

One thing outstanding is the influence of site preparation and attention to natural growing conditions. We enjoyed an example at the August Board Meeting which was held at the picturesque Bainbridge Island Library Garden. We assembled in a lovely gazebo, designed and constructed by board member John van den Meerendonk . It easily accommodated twelve and what a stimulating environment - surrounded by tall trees and landscaped pathways garnished with ferns - for conducting a meeting.

After our meeting the group was invited to the home of Jack and Diggs Docter where we were treated to a delicious lunch overlooking Puget Sound and the skyline of Seattle. A tour of Jack Docter's secret fern garden was enjoyable and educational. A small, secluded room in a wooded setting enclosed with deer fencing, this garden contained dozens of ferns growing as one would expect to see in a deep forest. Well done Jack and thank you.

A tour of Nancy Heckler's private garden arranged by Jocelyn Horder was our next stop. This garden is situated on several wooded acres overlooking Puget Sound and is filled with an eclectic mix of familiar and unusual plants. It is impressive in scope and well maintained. One could spend hours wandering the paths and identifying the plants. Our thanks to Nancy and Jocelyn for such an interesting experience.

Lyman Black hosted our September Board Meeting in a penthouse setting with a breathtaking vista of Lake Washington. We were treated to a wonderful lunch and a guided tour of a new idyllic fern garden situated in a cozy courtyard. This garden designed and planted by Lyman will become an outstanding retreat for relaxation and meditation. It is already very impressive. Thank you again Lyman.

We have continued interest in future projects and activities e.g. expanding the fern garden at Lakewold Gardens, and the possible installation of a fern garden in Seattle's Washington Park Arboretum.

We are also very busy with the plans for the BPS/HFF tour and meeting in the Northwest in July of 2003. The tour will include a wide variety of gardens and sites in the wild including ferny spots on Mt. Rainier and on the edge of the Pacific Ocean. We look forward to meeting members from near and afar. For an itinerary see page 99 and for more details see our web site at http://www.hardyferns.org/ident/fieldtrip.html or send an inquiry to Sue Olsen at 2003 128th Ave. S.E., Bellevue, WA 98005. It promises to be an outstanding ten days of ferning.

Thank you all for a rewarding and satisfying summer.

Best regards,

Pat Kennar, President

Lunch at Lyman's

l-r Richie Steffen, Jack Docter, Sylvia Duryee, Sue Olsen, Lyman Black, Katie Burki, Nils Sundquist, Bors Vesterby. Photo by Pat Kennar.

Welcome New Members

Foggy Trees Nursery

Teri Baber

Michael P. Curran

John DeMarrais

Dale McMurray

Will Morrisey

Linda Pace

Cynthia Salzman

Frank Speicher

Beth Stafford

THE HARDY FERN FOUNDATION

QUARTERLY

The Hardy Fern Foundation Quarterly is published quarterly by the Hardy Fern Foundation,
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Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

Please send your submissions to
Sue Olsen
2003 128th Ave SE,
Bellevue, WA, 98005.

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Editor: *Sue Olsen*
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Karie Hess (inside design)

MULCH MATTERS – Reflections On Capillary Action

By John Latter

Reprinted with permission from The Maple Society Newsletter, Spring 2002, Vol. 12/4, Editor Peter Gregory, Cirencester, England

Mulching here, mulching there, mulching everywhere? When we mulch our trees and shrubs, do we stop to think why we are doing it? What benefits do we expect? Mulching is one of the oldest known gardening sciences. In recent years, landscape architects have turned its use into an art. They use the variation in the product colour and particle size to create differences in visual impact and effect. For example, using Melcourt Biomulch can lighten up a shaded area of the garden.

When we mulch, how many of us know what a variety of applications there are? Modern trends encourage organic gardening, with less reliance on artificial fertilizers and chemical weed killers. A mass of supposedly environmentally harmonious mulches have come to the market place. Many are wholly inappropriate for the purposes for which they are being promoted.

Too many of us approach mulching as ritual or habit, rather than a science or art form. Let's look at the science of mulching. What happens when you mulch? In all honesty, this question cannot be answered without knowing in some detail what you are proposing to mulch with.

So let us go back in time to our secondary school chemistry class. How many of us were introduced to capillary action with the blotting paper test? When the teacher compressed a line down a fresh piece of paper and asked, "Will the liquid rise higher or lower, quicker or slower up the compressed lines?" why did most of us say lower and slower when, before our eyes, the opposite occurred? The majority of us who got the wrong answers consoled ourselves at the time with the thought that it was just a trick with no significance to life outside the classroom, and went back to using blotting paper for the purpose it was invented – making pellets to be propelled from elastic bands at the ears of the swots in the front row, who just happened to be lucky and guessed the right answer to the test.

Later in life, when these guys got their degrees, those of us at the back had made a little progress forward. The first realization in this process was that the swots did not guess, and the second that capillary action was very important in many aspects of life. Not least of all, its effects in soils and mulching. A very fine even soil, such as clay, will hold more water than a loose open soil, such as sand. The same is true of a mulch with one major exception – absorbency. Organic mulches have varying degrees of absorbency with their particles, size for size. Wood chippings are far more absorbent than bark chippings.

Mulch particle size

When buying a mulch, it is not just a simple case of finding a bag at your local garden centre that has "mulch" printed on it. Is it coarse or fine? Is it a mixture of both? Is it manufactured from highly absorbent material, or material of low moisture retention?

Where you want the maximum percentage of precipitation to go through the mulch

into the soil beneath, you need a material with no dust or fines (small particles) whatsoever – preferably with no particles less than half-an-inch (12mm). The finer the particle size, the greater the surface area within a given space for the water to cling to. Melcourt Bark Nuggets has all particles below 15mm removed. Where you want mulch to soak up water and hold moisture in the top few inches of the soil, then you should select a mulch with at least 50% of the particles half-an-inch or less. Either Melcourt Garden Bark of Melcourt Growbark would meet this requirement. They have also been composted for use as a high organic soil conditioner.

How many of us have inspected a bag that is open at the garden centre, decided that it is a dust-free grade, grabbed several of the unopened bags and then a-mulching we go? The first bag is tipped out among clouds of dust and fines – 20-45% you estimate. In a fit of annoyance you phone the garden centre. After you have removed the dust from your nostrils and complaint off your chest, the listener finally gets a word in edgeways and says he/she is the catering manager and, if you would like to hold on, he/she will get someone to deal with you! Murphy's Law usually ensures this episode will be enacted out during peak telephone rates. The voice returns, if you are lucky, to say they are trying to find the manager. Alternately, you may be soothed for the hundredth time by a computerized musical rendition of 'Greensleeves' or 'Home on the Range'.

Finally, after British Telecom shares have risen another point, a disarming voice of the opposite sex will ask if it can help. What follows is infinitely variable but will invariably end up explaining in the nicest possible way, that any idiot would realize all the dust and fines would migrate to the bottom of the bag – or that you did not ask for assistance to ensure you purchased what you wanted. You return to the garden thoroughly "mulched off", spread the other two bags, experience another coughing fit, and settle for mediocrity like the rest of us. Remember, even the garden centre has a display bed. If there were dust and fines in the mulch, they would have migrated down to the soil surface – so scratch around. Some centres use one grade on their beds and sell a different grade in bags. Try to buy a mulch where there is a picture on the bag, and you can ask at the check-out, "Will it look like the picture?"

Moisture/Air

Where you want the rainfall to go into the soil, dust and fines are "verboten", otherwise they settle down as an absorbent blanket on the soil surface. These tiny particles will absorb the moisture that trickles down through the coarser pieces, only for it to be re-evaporated back into the atmosphere. If it does not rain, then the layer of absorbent material will take moisture out of the soil by capillary action – which brings us back to the simple blotting paper exercise.

The blanket of dust and fines can impede the free exchange of the soil's oxygen and other gases. Oxygen is essential for the development and functioning of soil bacteria, and is as important to the respiration of plant roots as it is to the shoots and leaves. Do not restrict the air/water flow into the soil. A dust and fine-free mulch will maintain a good soil moisture gradient, stable temperature, and encourage earthworm movement and microbiotic activity. This further improves soil aeration and better drainage. If you have a soil mulched correctly, you will not need to cultivate it. Soil disturbance drives off worms and reduces other important organisms.

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Mulch Matters *continued from page 89*

Weeds

Soil correctly mulched with the right materials must make the soil near perfect for growth. Of course, this would include weeds, would it not? That is true, but provided the ground was cleared of weeds prior to the mulch application, weeding can be almost eliminated. This is only correct if you use a dust-free mulch. Seeds of all plants need a seedbed of nice small material in which to germinate. Whatever happens, birds, pets, insects, children will all conspire to introduce weed seeds into your garden. So avoid offering the weed seeds the best start in life in the form of that fine moist blanket of fine-mulch particles on the soil surface and protected from above by the coarser mulch. Some weed seeds may germinate in coarse fine-free mulches, but expire when their delicate root hairs are exposed to too much air because the spaces between the particles are too large in relation to their needs.

Weed seed only contains sufficient energy to send out an initial plumule (first shoot). The cotyledon (first seed leaf) must reach sunlight before the energy stored in the seed is totally consumed. Mulch depth takes this into account in that most seeds only have sufficient food to send out a 30-40mm cotyledon. If it does not get sunlight to set its own photosynthetic factory into action, it just withers away, is consumed by micro-organisms and worms, and converted into nutrients for those plants that are desired in that area. Usually, a minimum depth of 2" (50mm) of coarse fine-free mulch will defeat most weeds. A coarse mulch, such as Melcourt Bark Nuggets, has a chip size ranging from 15-75 mm.

Compaction

There is always a balance in nature and mulch is not excluded from this. The mulching product may be too heavy, as may be the case with gravel or ornamental stone chippings. The pressure these sorts of material apply has the same effect as continual light rolling. Slowly, by inextricably forcing air out of the soil and back to capillary action, the moisture rises nearer to the surface – fine for lawns but not for trees and shrubs. It is a useful technique around man-made ponds and lakes where aquatic plants are to be encouraged. Around trees and shrubs, and ornamental plant beds, they should be avoided unless spread very thinly on a permeable surface i.e. a mulch mat.

The capillary action will follow you round as you walk over your garden, particularly on shrub beds. A 10 stone (63kg) person in size 6 shoes, (*European measurements...Ed.)* applies a ground pressure of approximately 6 lbs per square inch at every step (almost half a kilogram per square centimeter). This assumes flat shoes – the initial heel impression is many times this pressure. Each footprint will tend to encourage moisture up to the surface, where it will be evaporated. How can mulching prevent this moisture loss? Quite simple. Provided a reasonably coarse mulch has been used, then any pedestrian movement across it will see the force spread over a much wider area, minimizing the compaction to an absolute minimum.

The Ferns of Grey & Bruce "Includes Most Ontario Ferns"

by the Bruce-Grey Plant Committee
(Owens Sound Field Naturalists).

Reprinted 2002 with corrections. Stan Brown Printers Limited, Owens Sound, Ontario. ISBN 0-9680279-2-X. 119 pp. illus. & photos.

Available from: The Bruce-Grey Committee

c/o The Owen Sound Field Naturalists

Box 401, Owen Sound, Ontario N4K 5P7

This little book is primarily the work of naturalist and retired printer Nels Maher. It is nicely laid out and easy for the amateur fern enthusiast to use. In addition to a four-page glossary, there are several pages devoted to illustrations of the parts of the fern and other descriptive terms. There is a nice practical "key" to the ferns called "ferns grouped for identification purposes". Each fern, fifty in all, has a complete page with description, silhouette and a two county township dot map. There are fifty color photos 6.4 × 9.5 cm. — one for each fern. Additionally there are spread sheets (tables) for the two townships listing the ferns occurrence and townships by name.

The silhouettes appear to be very accurate and should be useful in identifying the ferns. The color photographs are nicely reproduced, four to a page. Only a couple of the photos caused me trouble. Photo 3, *Botrychium simplex*, doesn't look like anything I've ever seen! Photo 6, *Botrychium oneidense,* looks more like *Botrychium dissectum* v. *obliquum*. There is an historical note of 3 ferns mysteries: *Marsilea quadrifolia, Aspidotis densa,* and *Schizaea pusilla.*

What's missing? Missing are: hybrids and fern allies. Perhaps they can be added to a future edition. The text doesn't mention *Polypodium appalachianum.* It isn't listed nor mentioned under *Polypodium virginianum.*

These detractions are minor and this is a very well done and useful book for anyone interested in northern North American ferns and for travelers to the Bruce Peninsula.

John Scott, Rockland Botanical Garden

ASPLENIUM TRICHOMANES - Maidenhair Spleenwort

James R. Horrocks - Salt Lake City, UT

Asplenium trichomanes

Also called Black-stemmed Spleenwort and Wall Spleenwort, this is an extremely hardy, neat little fern with spreading leaves, often growing with the walking fern, *Camptosorus rhizophyllus*. The Maidenhair Spleenwort is found growing from crevices of moist cliffs in "pockets and fissures of ledges and cliffs in shade". Durand goes on to say, "The finest specimens I have seen were growing on the moist mossy side of deep rocky ravines, but I have also found fine specimens in dry sand far back under over-hanging rock strata where they could not possibly be reached by even a hard driving rain." The species frequents limestone but is also found on noncalcareous rocks and can even tolerate acidic conditions. There are several subspecies or varieties found throughout the world but for the most part there are two subspecies in North America that are widely recognized. The diploid subspecies 'trichomanes' is rather delicate with the fronds more arching. It occurs on noncalcareous rocks. The tetraploid subspecies 'quadrivalens' has a much stouter rachis and stipe with thicker-textured pinnae and a more erect habit. This subspecies is the one usually found on calcareous rocks (limestone).

Asplenium trichomanes is native to the British Isles, Europe, Asia, and in many parts of North America. It is a common fern, known from Nova Scotia to Alaska and south to Georgia across to Arizona, Utah, Idaho, Washington, Oregon, and northern California. It is not nearly as common in the west as it is in the east. It may be confused with several other species. *A. viride* is similar but the rachis is green instead of dark brown. *A tripteropus* Nakai from China and Japan is quite similar but with rooting frond tips. There is a resemblance to *A. resiliens*, but the pinnae of *A. trichomanes* are less elongate and the texture is thinner and brighter green. Young plants of *A. platyneuron* can cause confusion but the pinnae of this species are auricled while in *A. trichomanes*, they are not, except in the median pinnae which may have a low acroscopic basal auricle. *A. trichomanes* is known to hybridize with *A. ruta-muraria*, *A. pinnatifidum*, and with *Camptosorus rhizophyllus*. There are two cultivars, a crested variety 'Cristatum' and an incised variety 'Incisum'.

Description: The rhizome is short, erect and creeping, sporting many fine, wiry rootlets that are matted and nearly thread-like. These rootlets penetrate deep into crevices and small pockets of cliffs and ledges. The uniform fronds appear as rosettes and tufts, the stipe and rachis dark brown, the scales narrowly lanceolate. The pinnae are evergreen. The fronds can be from three to eight or so inches long, linear-rhombic, and once-pinnate. The pinnae are oval or rounded and opposite each other. They are crenate or rarely lobed and, except for the median pinnae which are oblong and display a low acroscopic basal auricle, they are without auricles. The sori are mostly oblong or at times slightly curved and positioned obliquely to the midveins of the pinnae. The elongated indusia are opaque, greenish, and attached on the vein side. As the sporangia swell, they change to a shiny dark-blue or black color. As has been

mentioned, in North America, this species consists of both diploid and tetraploid subspecies, denoting at some point in its past, a doubling of chromosomes.

Culture: It is suggested that this little gem be grown in potting mix in a shaded area. Good drainage is essential. Wherry noted many years ago that it "can be grown in rock gardens, but rarely thrives". Mickel, on the other hand, insists that this species is "one of the best small ferns for the rock garden" and one of the "easiest to grow". It seems to need rather high humidity to really flourish. In the West where humidity is low, it is difficult to impossible to grow (....*It does very well in western WA....ed.*). Well-rooted specimens are necessary for success. Hoshizaki cautions that "some plants adapt more easily to cultivation than others". Foster remarks that established plants can tolerate alternating damp and dry spells but should be kept slightly moist at all times. "It is very important to simulate natural growing conditions." If you are lucky enough to live where conditions are favorable, this charming little fern is a special attraction.

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A Field Manual of the Ferns and Fern Allies of the United States and Canada (1985) David B. Lellinger, Smithsonian Institute Press, Washington D.C.

Field Book of Common Ferns (1949) Herbert Durand, G.P. Putnam's Sons, New York

Ferns to Know and Grow (1984) F. Gordon Foster, Timber Press, Portland

Ferns for American Gardens (1994) John Mickel, MacMillan Publishing Co., New York

Fern Growers Manual (2001) Barbara Joe Hoshizaki and Robbin C. Moran, (Revised) Timber Press, Portland

Update*: Forms of Christmas Fern, *Polystichum acrostichoides*

John D. Scott

I have documented over 30 distinct pinnae forms of the Christmas fern. Eventually I hope to have about six forms worthy for cultivation. To date I have examined hundreds of herbarium specimens at the Academy of Natural Sciences, Philadelphia; the Smithsonian Herbarium, Washington, D.C.; and the Herbarium at the New York Botanical Garden; and elsewhere. I have located a number of forms in the wild and in gardens. Unfortunately, most of the garden specimens have no documentation. I'd appreciate any help in locating living forms in public or private gardens and any documentation of these specimens. Contact me at johndscott@mindspring.com .

*Scott, John D. (2002) *The Victorian Fern Craze and the American Christmas Fern,* Hardy Fern Foundation Quarterly, 12(2): 43-44.

Horrocks, James (1997) *Polystichum acrostichoides,* Christmas Fern. Hardy Fern Foundation Quarterly, 7(1): 8.

Editor's note: The following was originally published in the British Pteridological Society's publication Pteridologist Vol. 3 Part 5 (2000) *to introduce the ferns and their habitats in the Pacific Northwest and to encourage their members to join the BPS tour that will take place here in the summer of 2003. It is reprinted here to encourage and welcome HFF members to join the tour as well.*

THE BEST OF THE WEST

Excerpts from a lecture for the BPS at Coventry, July 1999

Sue Olsen
Bellevue, WA USA


Polystichum lonchitis

Welcome to the U.S. Pacific Northwest where ferns find an accommodating climate remarkably similar to Britain's with summers and winters tempered from the extremes of heat and cold by ocean currents and with most seasons offering a healthy supply of moisture. ("The Pacific Northwest is fern country…." Sunset magazine, March 2000.) As in Britain, enthusiasm for gardening is keen with many areas of common interest – perennials, roses, alpines, rhododendrons and of course ferns, all attracting the allegiance of devoted gardeners, horticulturists and botanists.

Geographically the temperate area described ranges from tree fern amenable oceanic Northern California with a climate comparable to Cornwall, Devon and coastal Scotland, north through Oregon, Washington and British Columbia, Canada close to 2000 miles. As one goes north the weather naturally becomes increasingly cooler (and tree ferns can only be maintained with an artificial life support system!)

The majority of our native ferns grow in the maritime area west of the Cascade mountain range under a canopy of stately conifers, primarily *Pseudotsuga menziesii,* more affectionately known as Doug Fir, but also in the shade of hemlock, spruce, cedar and in California, of course, the redwoods. Meanwhile alders, maples and willows compete for light and space in the understory layer while smaller ornamental shrubs, among them gaultherias, vacciniums, flowering currants and mahonias line the highways and woodlands. (Sadly imported scotch broom and blackberries are also very much at home.) Finally we get down to the ferns and a fine lot they are. Some such as *Blechnum spicant*, *Asplenium trichomanes*, *Athyrium filix-femina* and unfortunately *Pteridium aquilinum* will be familiar sights to the British eye and in time we'll include a look at them as we survey the pteridological palette of the northwest.

Our native ferns are not confined to the coastal corridor. The alpine areas of our mountains and the drier reaches of the eastern slopes offer a completely different comple-

ment of pteridoflora including many coveted but ne'er do wells for cultivation. These tend to be much more specific in their combination of climatic and geological demands. Here the montane terrain offers *Polystichum lemmonii*, *P. lonchitis, P. scopulinum, Aspidotis densa* (a serpentine indicator), and *Cheilanthes gracillima* among others. All are a delight to the watchful eye of the hiking plantsperson, but are not for domestication, short-lived at best. The Pellaeas, Cheilanthes and other xerics that thrive in the sun soaked rocky sites farther east also are a demanding lot for the sea level gardener although arguably somewhat easier given a properly drained site with protection from the prevailing winter wet. We've had good success with half whiskey barrel plantings that are given a southern, sunny exposure and are permanently protected from precipitation by the eaves of the house. These are indeed a collection of interesting and admired species and probably more so because of an innate urge to succeed with the impossible. The focus of this article, however, will be on the ferns that the traveler can recognize and the gardener can introduce with confidence to the woodland fernery – those of the moisture laden western slopes.

Encouraged by a benevolent mixture of moisture and acid soil, *Polystichum munitum*, the sword fern of the west is our most ubiquitous native. While frequently passed over as being too common, it is really quite a handsome once pinnate evergreen and totally forgiving of any weather whims. It can be seen sweeping down hillsides and gracing undeveloped areas and is usually about three feet at maturity. Rain forest conditions swell this to five or even six feet. It is attractive for naturalizing or framing the woodland garden and is one of the few ferns that isn't flattened by our occasional snowstorm.

Polystichum andersonii, Anderson's holly fern, by contrast is far from common and quite distinguished. Similar in size and silhouette to *P. munitum*, it differs in having pinnae that are more deeply notched and fronds tipped with a single propagable bulbil. The emerging fronds are cloaked in shaggy silvery ornamental scales that enhance the ornamental value of this evergreen species.

Another near relative, *Polystichum braunii*, Braun's holly fern, decorates its spring foliage with silver as well. Those scales will fade to rust, but remain ornamental throughout the season. The fronds are quite lustrous and dressed to the ground with pinnae. It can be a somewhat touchy evergreen, but once established is a vibrant and elegant three-foot specimen.

Blechnums have always been among my favorite ferns and the credit rests with *B. spicant*, our deer fern. I associate it with refreshing woodland hikes, springtime wildflowers, serene mossy haunts and if you would - skunk cabbage! It demands acid soil and flourishes on the humusy woodland duff in the Quinault rain forest in Washington State's Olympic National Park – the only place where I've seen prothalli growing in the wild. It is reputed that the resident Roosevelt elk prefer to dine on *P. munitum* giving Blechnum the opportunity to dominate the forest floor flora. *Woodwardia fimbriata* a lusty cousin of Blechnum grows sparingly in Washington, better in the redwoods of Southern Oregon and best of all in Redwoods National Park in California. Here in the company of towering redwood trees, the giant chain fern towers in its own right to nine feet near the sea or a more modest six feet father inland. It is a coarse fern but highly desired for its stately presence in a protected landscape.

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The Best of the West *continued from page 95*

Athyrium filix-femina, var. *cyclosorum*, the so-called lady fern, can also willingly reach six feet in a damp shady habitat. Unfortunately, for us it can also be quite weedy and seedy frequently arriving in the garden as an uninvited guest (as a "cute" little sporeling in a choice planting). There are so many other ornamental options that it is not a local favorite. Unlike its British brethren ours are also not inclined to sport so most cultivars (from Mother Nature's baroque period) are imported.

Our two most common Polypodies grow mainly as epiphytes. *Polypodium glycyrrhiza*, the licorice fern, is by far the most common. Its tree of choice is the native large leafed maple, *Acer macrophyllum,* where it shows off especially well when the tree is defoliated in the winter. It also looks well in the fall when surrounded by the platter sized yellow leaves. It does not require an arboreal site, however and I've seen great stands of it on bleak coastal wind swept sand dunes and on road cuts through glacial rubble. Perhaps a lack of nutritive material is the common link. American Indians used the rhizome for licorice flavoring hence the common name. (Don't expect candy!) *Polypodium scouleri* grows exclusively in close proximity to the Pacific Ocean looking like a giant eagle's nest in the crotches of spruce trees (dead or alive). It is quite distinct with succulent leathery one-foot fronds and prominent polka dots of yellow spores decorating the fern's underside. The natural setting is almost cave like in its darkness. In the garden it will do well in loose loamy soil in deep shade - without the help of a spruce tree! These Polypodiums will on rare occasion hybridize - a fact I learned while visiting gardens in Germany!

The maidenhairs, in our case *Adiantum aleuticum,* have in my 35 some years experience been the most appealing to the casual gardener – the one who wants a token fern or two (followed incidentally by *Athyrium niponicum* 'Pictum' and *Dryopteris erythrosora*). These are the customers who ask, "where are the flowers" or note that "all ferns look alike". However, it is easy to admire the ethereal and delicate tracery of this graceful native. The deciduous two-foot fronds divide in a lax pedate manner (it was formerly classified as *A. pedatum*) on top of stiff black stipes used by Native-Americans in basket weaving. In the landscape it flourishes in the company of a water feature and in nature it shows up in an incredible assortment of habitats - hinting to me that its classification may yet undergo more revision. *Adiantum aleuticum* 'Subpumilum' is a Lilliputian imitation of the species and has bounced around the nomenclature loop more than any other fern I know. It is now considered (in my opinion unfortunately) a "dwarf ecotype" within the standard range of the species. I have propagated this many times (and I'm talking progeny by the thousands) and have never had a single plant that was anything other than a dwarf! By whatever name it is an attractive imbricate miniature that is a welcome addition to the garden. It is not common in nature and was only discovered a relatively recent 40 years ago.

There are other small ferns that grace our landscape and gardens and *Gymnocarpium dryopteris,* the oak fern, is yet another favorite. (Here too we have research in progress with attendant changes in nomenclature). Its charm remains unchanged, however, as this is the woodland's fairy princess who dances with green gossamer triangular skirts amongst the bunchberries and wild rubus, the nymph who shades the salamander and who with moist roots will spread with restraint in the garden's humus. The soft kelly

green fronds spread horizontally atop a blackish stipe and are typically about six inches tall.

No discussion of small native northwest ferns would be complete without a look at *Asplenium trichomanes* var. *trichomanes*. Here we have the woodland counterpart of a fern incredibly common and handsome in the mortared crevices of ancient and weathered buildings in Britain and on the continent. Ours is a handsome woodland calcifuge with beadlike pinnae decorating a black stem. It is quite amenable to cultivation. However, it definitely is not common. I hauled our three children over many a back road and trail before finding it in the wild (and then in abundance) on the flanks of Mt. Rainier.

SITES FOR FERNS IN THE WILD:

T.M.C. Taylor in his excellent but now out of print book lists some 125 ferns and fern allies for the Pacific Northwest compared to just over 100 in Britain and Ireland. Of these some 30 can be found in the Perry Creek drainage which has recently been granted Federal Research Natural Area status. The Perry Creek trail is without question the favorite for a fern foray in the state of Washington. The trail originates on a forest service road east of Granite Falls and the Verlot Ranger Station, and travels gently upward for two miles to a great picnic spot by a waterfall. Most ferns including the elusive Botychiums, which are gourmet goodies for the local deer, are found in the first mile. Here too alpestrine species such as *P. lonchitis* drop to an accessible level and the keen observer may find the rare hybrid *P. munitum x P. andersonii.* The trip to Perry Creek can be combined with a drive through carpets of *Lycopodium clavatum* up to Coal Lake (right next door) for a photo study of the newly described *Cryptogramma cascadensis* nestled among the boulders. Also nearby, across the highway there's a popular boardwalk stroll to the Big Four ice caves presenting the explorer with a lowland opportunity to see *Thelypteris quelpaertensis* (syn. *Thelypteris limbosperma, Oreopteris quelpaertensis, Dryopteris quelpaertensis, Thelypteris oreopteris, Oreopteris limbosperma, Dryopteris montana* – oh my!)

The Olympic Peninsula is a deservedly popular tourist destination and crosses climatic zones from coastal to alpine. Travelers can marvel at the changing moods of the Pacific Ocean while watching shore birds swooping around *Polypodium glycyrrhiza* festooned sea stacks. Or they can combine an alpine garden pilgrimage, which should include a fern or two, with a visit to Hurricane Ridge with its panoramic view of the dramatic peaks of the snow-covered Olympic mountain range. Yet another opportunity to explore is presented by the temperate rain forest. A venture up the Hoh Valley leads to an old growth forest draped with curtains of *Selaginella oregana*. Farther south trails traversing habitats from bogs to the misty vicinity of waterfalls around Lake Quinault offer a range of opportunities for viewing lush thickets of ferns. (While there a salmon lunch or dinner at the charming Lake Quinault Lodge won't hurt the memories either!)

PUBLIC GARDENS FEATURING FERNS:

The most comprehensive collection and display of hardy ferns in a public garden in

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The Best of the West *continued from page 97*

Washington state is the growing collection of the Hardy Fern Foundation housed at the Rhododendron Species Botanical Garden, a 24 acre reserve at Weyerhaeuser corporate headquarters in Federal Way. Established in Oregon in 1964 with a mission of conservation, research and acquisition, (the present site was planted in 1974), the Species Foundation is internationally recognized for its role in selecting and displaying the finest available specimens of rhododendron species. The garden's varied terrain with woodland, pond and alpine areas is not exclusively planted with rhodies, however, and is the primary test site for the Hardy Fern Foundation. Following a modest initial planting in 1989 the fern collection has grown and now includes several hundred plants in over 100 taxa. New plants are added as they are propagated.

The Kitsap County Bainbridge Island Library may sound like an unlikely site for a fern garden, but this award-winning garden is the newest in the growing list of Hardy Fern Foundation display gardens. HFF board member John van den Meerendonk designed the one-acre garden incorporating an extensive variety of ferns. This is a peaceful garden with a meandering stream and a setting that encourages quiet reflection. The Friends of Libraries U.S.A. recently deemed it "the most beautiful, community-centered library garden in the United States" while awarding it first place in the "Grow Together Garden Contest" a contest jointly sponsored with Storey Publishing. Not only is it beautiful but it has successfully increased public awareness of the diversity of the fern world. The garden can be reached by ferry from Seattle and the trip can be extended with a visit to the nearby Bloedel Reserve for a full day's excursion. The reserve, open to the public by reservation, is the 150-acre estate garden of a timber baron and garden enthusiast who with his wife created massive displays primarily of northwest natives. Here *Blechnum spicant* flourish in the quiet company of assorted mosses and other native woodland species in what is primarily a tranquil second growth timbered shade garden. There is a large lake where swans are bred on the property and natural stands of *Polystichum munitum, Dryopteris expansa, Polypodium glycyrrhiza* and Equisetum surround the setting. There may not be a great variety of ferns but the garden with its grand vistas and mass plantings is about as close to a British estate garden as we can come in the Pacific Northwest.

Elandan Gardens on the shores of Puget Sound in Gorst (what a name!), WA is a 6-acre masterpiece on what was once a landfill. Creatively designed and maintained by Dan Robinson, an internationally recognized master bonsai artist, the garden is a living museum for over 150 of his handsomely gnarled and shapely specimens. These are not your tiny plants in pots, but large scale lovingly tended unique artistic works that are set among hand chosen huge (to eight tons) mossy boulders and blackened snags. Native ferns especially *Blechnum spicant, Polypodium glycyrrhiza, Adiantum aleuticum* and *Polystichum munitum* are blended into the landscape complementing the displays. Azolla floats in a barrel with fellow aquatics while *Woodwardia fimbriata* stands majestic in front of weathered driftwood. This unique garden is a scenic one-hour ferry ride from Seattle and while not a garden to visit for great numbers of ferns, it is to be admired for their presentation.

PRIVATE GARDENS:

There are so many outstanding private gardens with fern treasures in the Seattle area

that it would require another article to adequately describe them individually. Let it be said, however, that Pteridomania is alive and well in the Pacific Northwest where many of us were gently lead into the field and encouraged by the patient coaching of Seattle's late Neill Hall, the Curator of the American Fern Society's Spore Exchange for many years.

While this sampling has been written with an eye towards the proposed BPS Field Excursion to the Pacific Northwest in 2003, I sincerely hope that any fern lover who passes this way will enjoy our woodland wonderland.

Note – for the cyberlinked more detailed information can be found at the following sites:

Bloedel Reserve: www.bloedelreserve.org

Elandan Gardens: www.Elandangardens.com

Hardy Fern Foundation: www.hardyferns.org

Rhododendron Species Botanical Garden: www.rhodygarden.org

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Itinerary for the BPS/HFF Summer 2003 Foray

Day 1 July 15 - Afternoon - Gardens - Kruckeberg, Shoreline, (alt. Miller Botanical Garden) Jansons, Kenmore; Welcome banquet, Eve lecture - native ferns; Housing University of Washington dormitory	D
Day 2 July 16 - Field trip Perry Creek escorted; UW housing	BLD
Day 3 July 17- Gardens - Duryee, Seattle, Kennar, Bellevue, Bradner, Bellevue, Olsen, Bellevue; UW housing	BD
Day 4 July 18- Henry's Plant Farm, Snohomish, Fancy Fronds Nursery, Gold Bar evening Leavenworth; Lodging Howard Johnson's Alpen Inn	BL
Day 5 July 19- Field trip North Fork of the Teanaway River escorted; UW housing	BLD
Day 6 July 20 - Rhododendron Species Botanical Garden, Federal Way, Elandan Gardens. (Alt Lakewold) UW housing.	BLD
Day 7 July 21 - Mt Rainier escorted; UW housing	BD
Day 8 July 22 - Bainbridge Island Library, Bloedel Reserve, Horder Garden, lunch Poulsbo, Evening Best Western Inn, Port Angeles	B
Day 9 July 23 - Olympic Nat'l Park Headquarters, Hoh River, Kalaloch, evening Kalaloch Lodge, Pacific Coast	BL
Day 10 July 24 - Lake Quinault Loop, Lunch Lake Quinault Lodge, evening Red Lion Inn Kelso	
Day 11 July 25 - Mt. St. Helens all day, farewell banquet Salty's restaurant West Seattle. Lodging??	BD

Ferns of Wisconsin's Driftless Area and the Baraboo Hills

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published jointly with the Fiddlehead Forum

The American Fern Society's annual fern forays for 2002 were held in conjunction with the Botanical Society of America Meetings in Madison, Wisconsin. The field trips were on Saturday and Sunday August 3-4 and included visits to six outstanding fern sites in Wisconsin's Driftless Area and Baraboo Hills.

On Saturday, thirty-two participants boarded the school bus at the Pyle Center on the University of Wisconsin Campus. We traveled 30 miles northwest to our first stop at the Ferry Bluff Natural Area. It was a fine day for traveling, sunny and pleasant with low humidity. As we neared our destination, we turned off the main road to follow a narrow gravel road that snaked around the base of the bluff for a mile or so to emerge on the bank of the Wisconsin River. Ferry Bluff derives its name from a 19th century ferry service, powered by rowboat that carried people, animals and produce across the Wisconsin River. Although the ferry was discontinued over a century ago, the road and landing have changed little since then.

We left the bus at the old ferry landing and climbed the half-mile path to the Cactus Bluff overlook. On our left lay the Wisconsin River bottoms, on our right the bluff rose steeply to cliffs of Cambrian Sandstone and Ordovician Dolomite. Our first pteridophyte was *Pteridium aquilinum,* common in the open oak woods on the south side of the bluff. As the path turned upward into a ravine we encountered ferns that favor moister conditions: *Adiantum pedatum, Athyrium filix-femina, Osmunda claytoniana,* and a few scattered *Botrychium virginianum.* As the path reached the summit it opened onto a dry prairie situated on a high ledge of dolomitic sandstone. What a view! The broad Wisconsin River spread out below – flowing towards us from the east, bending at the base of the cliff, and flowing on to the southwest – a ribbon of blue water and golden sandbars.

The Cactus Bluff overlook faces directly southwest and provides an ideal habitat for three xerophytic ferns: *Pellaea glabella, P. atropurpurea* and *Cheilanthes feei.* We found some photogenic specimens of each at the top of the cliff. From here the trail descended in stair-wise fashion to the right, so we could climb down to a ledge beneath the overhanging cliff. Here we found many more of the xerophytic ferns plus *Equisetum hyemale* and *Cystopteris bulbifera.* To top it off, Robbin Moran found *Woodsia oregana*, establishing a new station for this species.

Our second stop was Hemlock Draw, a Nature Conservancy preserve situated in the Baraboo Hills about 15 miles north of Ferry Bluff. From the preserve entrance the trail followed a rocky stream where we saw: *Adiantum pedatum, Athyrium filix-femina, Botrychium virginianum, Cystopteris tenuis, Dryopteris carthusiana, D. intermedia, Onoclea sensibilis, Osmunda claytoniana, O. cinnamomea* and *Pteridium aquilinum.* Our main interest at this site, however, was a sandstone cliff where we found *Huperzia porophila, H. lucidula* and their hybrid *H.* X *bartleyi (H. lucidula* X *H. porophila).*

Carl Taylor instructed us on how to recognize the subtle differences in leaf morphology between the parent species and the hybrid. Dean Whittier was smiling at the prospect of germinating spores of *H. porophila*. The *Huperzias* were accompanied by a nice display of *Phegopteris connectilis,* a northern species quite at home on the cool sandstone cliff. From here we continued our hike to an outcrop of quartzite where we found *Asplenium rhizophyllum, Polypodium virginianum* and *Woodsia obtusa.*

After a box lunch and a group photo by Mike, our bus driver at nearby Natural Bridge State Park, we headed south towards our next stop at Governor Dodge State Park. On the way we passed Taliesin, the home of Frank Lloyd Wright. David Lellinger pointed out Wright's home and studio and relayed some interesting stories about the architect as we passed.

We arrived shortly at Governor Dodge State Park where we hiked the Steven's Falls nature trail. Steven's Falls lies at the head of a narrow gorge cut through St. Peter Sandstone. Here we found *Dryopteris marginalis, D. intermedia, D. carthusiana, D.* X *triploidea*, *Polypodium virginianum, Asplenium rhizophyllum, Cystopteris bulbifera, C. tenuis and Gymnocarpium dryopteris* growing on the moss covered cliffs and talus slopes. Farther down the trail we encountered some nice specimens of the red-stiped form of Lady Fern, *Athyrium filix-femina f. rubellum* and several healthy plants of *Deparia acrostichoides.*

Our last stop of the day was the Trout Creek fishery area to see *Asplenium pinnatifidum,* the fertile allotetraploid of *A. montanum* X *A. rhizophyllum.* This fern is known from only 4 stations in Wisconsin which are disjunct by hundreds of miles from the main range in Illinois and Indiana. Our driver Mike skillfully negotiated the steep turn-off from the main road to the parking area. There were no trails here. We crossed Trout Creek on stepping-stones and forged our way through old fields and blackberry thickets to the base of the sandstone cliff where the *A. pinnatifidum* grows. The sandstone was intricately carved by the wind and harbored several dozen plants of the Lobed Spleenwort in deep crevices. The top of the outcrop was quite dry and supported *Pinus resinosa, Gaylussacia baccata* and *Epigaea repens.* On the upper ledge we found a single patch of *Selaginella rupestris.* By

Asplenium pinnatifidum. Photo by Tim Kessenich.

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Ferns of Wisconsin's Driftless Area and the Baraboo Hills
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now it was getting late, so we returned to the bus. Mike again skillfully negotiated the tricky turn to the main road and we headed back to Madison.

Sunday started with rain showers that dissipated quickly, as we requested, when we began boarding the bus. We had 45 participants so our transportation was upgraded from school bus to air-conditioned coach. A nice benefit as the humidity was increasing. We were headed for Mirror Lake State Park, about an hour's drive northwest of Madison. The sky cleared as we reached our destination, Fern Dell, a little known and seldom visited corner of the park.

Fern Dell is a narrow gorge, 60 to 70 feet deep and a half-mile long, cut into Cambrian sandstone by glacial melt water more than 10,000 years ago. We made our way carefully down the side slope to the bottom of the gorge. Here we found *Dryopteris intermedia, D. carthusiana* and their sterile hybrid *D.* X *triploidea* growing side by side. Jim Montgomery showed us the field characteristics of each parent and how they blended to form the intermediate characteristics of the hybrid. Chris Haufler presented a short talk on *Polypodium*; Jakob Schneller spoke on *Athyrium*; and Kathleen Pryer on *Gymnocarpium.* Farther down the gorge we made our way through a spectacular stand of chest-high *Dryopteris goldiana* and *Deparia acrostichoides.* The cliffs above were festooned with *Polypodium virginianum, Gymnocarpium dryopteris* and *Phegopteris connectilis.* Eventually we reached the end of the gorge at the edge of Mirror Lake where we found *Dryopteris marginalis* growing at the feet of ancient White Pines. We made our way carefully up an old path cut into the sandstone to the top of the gorge and back to the bus.

From Fern Dell we traveled south to Devil's Lake State Park in the heart of the Baraboo Hills. We had lunch in the picnic area surrounded by quartzite bluffs rising almost 500 feet above the lake. Roger, our coach driver, took a group photo. After lunch Pat Cox, Randy Small, Jessica Budke and Neil Luebke went for a dip in Devil's Lake to see if they could locate *Isoetes echinospora.* The rest of the group hiked up Messenger Creek into the Koshawago Springs Natural Area. The going soon became difficult. The trail, as well as the creek, vanished from time to time in a rough terrain of quartzite boulders. But despite the obstacles, we did see a good diversity of pteridophytes. Species not seen at our previous stops included: *Botrychium dissectum, Equisetum arvense, Equisetum sylvaticum, Matteuccia struthiopteris, Equisetum* X *ferrissii (E. hyemale* X *laevigatum)* and *Thelypteris palustris.* To the delight of Dave Barrington, we also found a nice stand of *Phegopteris hexagonoptera,* which is not abundant in Wisconsin. The end of our hike led to an open meadow filled with sedges, cardinal flowers, and a mixed stand of *Osmunda cinnamomea* and *O. clatoniana.* Here we found some unusual *Osmundas* with contracted pinnules in the central parts of the blade. One abnormal fertile frond was found and Florence Wagner and Diana Stein deliberated on the possibilities of an interspecific hybrid. We hiked back out and gathered with the successful quillwort hunters at the parking area to compare notes and board the bus to return to Madison.

After trudging through the woods for two days it felt good to fall back in comfortable seats, relax, and enjoy the countryside on the way home. All in all we had a good

outing, we saw 37 species and hybrids, the weather was good, the insects weren't too bad, and, best of all, we had a great group of participants. Special thanks to Ted Cochrane, Curator of the University of Wisconsin Herbarium, who made arrangements for transportation, meals and assisted us in selecting the sites to visit and to Rose Henderson, Collections Manager at the Milwaukee Public Museum, for producing the foray booklet.

What is the Driftless Area?

The word "drift" is a general term for the rock material deposited by glacial ice or melt water. Roughly, the southwest quarter of Wisconsin and adjacent parts of Illinois, Iowa and Minnesota are devoid of glacial drift, and thus, thought to have been free of the glacial ice that covered most of the Upper Midwest during the Pleistocene epoch. This is important for those of us who love ferns. The Driftless Area has a very different landscape from the surrounding glaciated areas. It is a highly dissected upland featuring many cliffs and deep valleys. This affords a greater variety of microhabitats for plants of both southern and northern affinity. In addition, the Driftless Area lies at the junction of three major vegetation formations, the tall grass prairie, eastern deciduous forest and northern mixed coniferous forest. This provides a greater diversity of plant species, many of which are at the limit of their ranges or disjunct from their normal ranges. (See Peck, James H. 1982. Ferns and fern allies of the Driftless area of Illinois, Iowa, Minnesota, and Wisconsin. Milwaukee Public Museum Contributions in Biology and Geology 53: 1-140).

Mid-Atlantic Fern Foray

by Bill Plummer

Painted Post, New York

When I learned there was going to be a fern foray in the east, my adrenaline started flowing and I immediately sent in my registration. It was billed as the Mid-Atlantic Fern Foray and was sponsored by the Hardy Fern Foundation and the Delaware Valley Fern & Wildflower Society. It was a five-day event, from Tuesday, July 9th through Saturday, July 13th. There were eight regulars plus three hosts—Jack and Rose Marie Schieber, who were the foray's organizers, and Otto Heck. Three of the participants were from Seattle—Rob Leitner, Sylvia Duryee and Sue Olsen (Sue spoke to our chapter several years ago). Catharine Guiles from Maine, John Scott from Pennsylvania, and Nels and Jean Maher from Owen Sound, Ontario, were the other regulars. Both Catharine and John are recent contributors to the *Hardy Fern Foundation Quarterly*, and John's Rockland Botanical Garden was on the foray. John is collecting forms of the Christmas fern, *Polystichum acrostichoides*, and I took a "corkscrew" form down which Toni Wilkinson had gotten from Yuri Orlov. The Mahers lead nature groups in Grey and Bruce Counties in western Ontario and have written three guides on the counties' ferns, orchids, and rare and endangered plants. When we met the Mahers, Jean was wearing a delightful and hilarious T-shirt showing "Nelson talking to the ferns". Depicted were: Maidenhair fern, *Adora mea*; Walking fern, *Bootin Alongus*; Hart's Tongue fern, *Extremis Rudeus*; and Sensitive fern, *Mucho Afraidis*.

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Mid-Atlantic Fern Foray *continued from page 103*

Woodsia obtusa. Photo by John Scott.

Nels also had on a T-shirt "The Canadian Fern Checklist" with 37 of Nels' fern prints illustrated. Not normally a person who goes in for souvenir T-shirts, this was one I had to have. Mike and Sharon Rosenthal, knowledgeable naturalists, joined us for the trips to northern New Jersey and central Pennsylvania; and Jim Montgomery, of Berwick, PA, was our guide in that state. Six of us stayed at a motel in Clinton, NJ, which thus became the jumping-off point for each day's adventure.

Our first foray was to northern New Jersey, with our first stop at Camp Bernie, a YMCA camp, to search for grape ferns. Our search was made easier by the Rosenthals, who had marked their location with sticks. Even so, other than the rattlesnake fern, *Botrychium virginianum*, they are small and easily overlooked. We added *B. lanceolatum, B. matricariifolium, B. simplex,* and *B. dissectum,* and I soon became able to identify them. We did not find *B. oneidense*, which does grow at that site.

Our second stop of the morning was at Oxford Furnace, an old lime kiln, which provided an ideal habitat for *Pellaea glabella* and *Woodsia obtusa*. At our next destination, the Andover railroad old right-of-way, we examined *Cystopteris bulbifera* and *C. tenuis* (which is very similar to *C. fragilis*, a species that does not occur in New Jersey). Four of the spleenworts were found—maidenhair, *Asplenium trichomanes;* ebony, *A. platyneuron;* wall rue, *A. ruta-muraria;* and the walking fern, *A. rhizophyllum* (*Camptosorus rhizophyllus*) as well as Scott's spleenwort, *Asplenosorus ebenoides*, the hybrid between the ebony spleenwort and the walking fern. We also saw the purple and smooth cliff brakes (*Pellaea atropurpurea* and *P. glabella*) and *Polypodium appalachianum,* which differs slightly from *P. virginianum*, but you could not prove it by me.

Next, it was time for a wonderful picnic at Kittitiny Valley State Park —one of three organized by Rose Marie Schieber which we enjoyed during the week. We then explored the Sussex Branch Trail, and the Paulinskill Trail which was particularly abundant with ferns and more than 30 were recorded. We found a number of hybrids of the wood ferns. It was fun to see the experts analyze the fronds and the position of the sori to determine that one particular fern was a hybrid between *Dryopteris clintoniana* (itself a hybrid between *D. cristata* and *D. goldiana*) and *D. marginalis*.

The last stop of the day took us to the Delaware Water Gap. Some members of the group explored Dunfield Creek Trail while others headed up the Tammany Hill Trail, which offered a stunning view of the gap to the south. Our goal was to find *Cheilanthes lanosa* and *Woodsia ilvensis*. Find them we did, but they were all dried up from the

lack of rain. I kidded Otto that he should have come up the day before and given them a good soaking to revive them.

On the second day, we traveled north to New York City and the New York Botanical Garden in the Bronx. We hoped that John Mickel and Robbin Moran, the senior curator and curator, respectively, of the garden's Institute of Systematic Botany, might be there, but they were out of town. Word had it that Robbin Moran was ferning in Costa Rica. The NYBG's Native Plant Garden contains the Gordon Foster Fern Collection, which is also a good place to see Dryopteris hybrids, among them *D.* x *slossonae* (*D. cristata* x *D. marginalis*), *D.* x *dowellii* (*D. clintoniana* x *D. intermedia*), *D.* x *australis* (*D. celsa* x *D. ludoviciana*) and *D.* x *boottii* (*D. cristata* x *D. intermedia*). Following lunch at the garden's restaurant (which Sue Olsen forewent in order to go through the newly restored conservatory) we journeyed to Tarrytown, in Westchester County, where we saw the Lyndhurst fern garden. This relatively young collection, dating from 1989, grows under a canopy of yellow birch, *Betula alleghaniensis*. The raised beds are bordered with stone, and each bed is devoted to a particular genus—Athyrium, Adiantum, Dryopteris, Polystichum, Cystopteris, etc. Gray Williams, who was our guide there, is responsible for the collection, and he and colleagues from the Taconic Gardeners Club regularly divide the ferns to create a massed effect. The *Polystichum braunii* was particularly striking, as was the clump of *Dryopteris pseudo-filix-mas.* Gray has obtained plants from John Mickel and from the Norcross Wildlife Foundation, in Massachusetts. Unfortunately, because John Mickel was out of town, we were unable to visit his own marvelous collection at his home in Westchester County.

On day three, our group headed to southern New Jersey and the Pine Barrens. Our route was to take us through Fort Dix, but armed guards at the entrance said that civilians, even peaceable fern enthusiasts, were no longer welcome, so a detour was necessary. We stopped first at White's Bog, where our guide for the day, field botanist Linda Kelly, joined us, as well as three DVFWS members, Bill Bondinell, Donna Wilhelm, and Ellen Wilen. There, we found some nice specimens of Botrychium, but Otto, in spite of a noble effort, could not find the walking fern. We also found the adder's-tongue fern, *Ophioglossum vulgatum.* Driving along by the cranberry bogs, we spotted a huge clump of the marsh fern, *Thelypteris palustris*, growing in full sun. And along the roadside there were sundews and pitcher plants in flower as well as the white-fringed orchid. The two chain ferns, *Woodwardia areolata* and *W. virginica,* were also found in the Barrens, as were *Azolla caroliniana* and two of the Osmundas, the royal and cinnamon ferns. The curly grass fern, *Schizaea pusilla,* was the big find on the boardwalk at Greenwood Forest Wildlife Management Area.

That evening we drove to the home—and garden—of Jack and Rose Marie Schieber in Holland, PA, north of Philadelphia, for a delicious buffet dinner. Jack has an impressive fern collection, and his weed is *Dryopteris carthusiana*, which pops up all over the garden. A big expanse of *Adiantum capillus-veneris*, the southern maidenhair, was impressive and unbelievable; this species is rated Zone 7-10. Equally impressive was an outstanding clump of the holly fern, *Polystichum braunii*. These ferns were grouped around their patio. In the beds in the main garden there were more ferns. The one that caught my eye was *Arachniodes simplicior* var. *variegata* with its lustrous dark green fronds. Hardy to Zone 6, it is well worth the attempt to grow it. On the other side of the greensward were *Cystopteris protusa*, the southern fragile fern, and *C. tenneseensis*, a hybrid between *C. protusa* and *C. bulbifera*.

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Mid-Atlantic Fern Foray *continued from page 105*

On Friday, joined by DVFWS member John DeMarrais, we traveled to Pennsylvania through the Poconos, seeing *Rhododendron maximum* still in bloom in the woods bordering Interstate 80. Exiting at White Haven we traveled to the state's newest park, Nescopeck, where we were greeted by park ranger Diane Madl. Walking down the road Mike Rosenthal spotted a purple-fringed orchid in a damp locality. (John Scott pinpointed the site using his GPS). But the Hartford, or climbing, fern, *Lygodium palmatum*, was the real find of the morning—acres and acres of them growing up through low-bush blueberries and even up the stem of a fly poison, *Amianthium muscaetoxicum*. From Nescopeck we headed to Berwick, where we were joined by Jim Montgomery, co-author, with David Fairbrothers, of *New Jersey Ferns and Fern Allies*. We crossed the Susquehanna and headed upland to Ricketts Glen State Park, which is almost due west of my hometown of Wilkes-Barre. There are 21 waterfalls in the park, the highest being Ganoga at 94 ft. The 500- to 700-year-old hemlocks, *Tsuga canadensis*, are the other notable feature there. Alas, they are now in danger of dying due to the woolly algedid. A number of windstorms over the past forty years have toppled some of these giant trees. We only had time to walk a few hundred yards up the 3.5-mile trail that follows Kitchen Creek to Lake Jean and to explore the lower waterfall below the highway, but there we found *Polypodium appalachianum*, *Cystopteris tenuis*, and one lone *Asplenium rhizophyllum* on the damp cliffs above the creek. By not ascending the trail, we alas missed seeing one of the southern-most sites of *Polystichum braunii*. This species, by the way, does not occur in New Jersey.

Instead we drove uphill to an old railroad bed to see Lycopodiums, or club mosses, specifically, *Lycopodium obscurum* (whose spores, Jim informed us, are used in fireworks!), *L. clavatum, L. digitatum, L. tristachium,* and *L. annotinum.* Unfortunately, we did not see *L. inundatum.* This area is over 2,900 ft. in altitude and is subject to cool nights and even frost on occasion. Our next, brief stop was at a lake, where Jim pointed out *Isoetes echinospora* growing in the shallows.

We then headed back by way of Sullivan Falls to see *Cystopteris fragilis,* which is rare in northern Pennsylvania. On the rocky hillside were huge patches of *Polypodium appalachianum*, some drying up from the drought. Sharon Rosenthal spotted *Gymnocarpium dryopteris*, oak fern, to add to our list. Then it was to a diner for dinner and the long drive back to Clinton, arriving after ten o'clock. (The last time I was in Ricketts Glen was in 1949 or '50 when a group from college went down for the day. That day we walked and ran the entire seven miles and have a photo at the three-and-a-half-mile post to prove it!)

Our last jaunt was to the Morris Arboretum in suburban Philadelphia, where we were joined by DVFWS members Tony and Carol Carbo and, again, Donna Wilhelm. Our guide there, showed us the arboretum's Garden Railroad, the Rose Garden with its rock-garden wall, and their Victorian-style fernery constructed in 1899 and restored and dedicated in 1994 as the Dorrance H. Hamilton Fernery. For perhaps a half hour, we left the world of temperate ferns and visited the tropics, admiring the fernery's specimens of Cyatheas, Blechnums, Davallias and other tropical beauties and discussing their care with curator Dianne Smith.

It was then time for lunch followed by the trek to Mertztown, PA (near Allentown), the location of John and Margaret Scott's Rockland Botanical Garden. After a tour there of three hours we had only begun to explore the Scotts' nine acres of woodland, let alone get more than a glance at their conifer collection. There were 38 indigenous ferns in the woods, to which John has added 60 additional North American ferns and

fern allies and about 80 exotic ferns, including numerous varieties of *Athyrium niponicum*, both painted and unpainted. There were three Dryopteris hybrids to which John has added eight more. John also has a collection of variant forms of *Polystichum acrostichoides*, some of which he got from Dr. Edgar T. Wherry, with whom he studied. After a delicious dinner prepared by John and Margaret, it was time for the Clinton group to return to their motel, and for me to head north for the four-hour drive home to Painted Post.

The author thanks Catharine W. Guiles for her editorial suggestions

Relevant web sites

Delaware Valley Fern & Wildflower Society - www.dvfws.org
Lyndhurst - www.lyndhurst.org
Morris Arboretum - www.upenn.edu/morris
New Jersey Pine Barrens - http://state.nj/us/pinelands/recguide.htm
New York Botanical Garden-www.nybg.org
Rockland Botanical Garden - http://johndscott.home.mindspring.com
Michael Rosenthal (New Jersey ferns) - www.msrosenthal.com

Ferns and fern-allies found in specific locations in New Jersey and eastern Pennsylvania by members of the Delaware Valley Fern & Wildflower Society. Those participating in the July 2002 fern foray did not visit all these locations, and thus did not see all these species, varieties, forms, or hybrids. Unless noted, plants are found in both states.

This list was compiled by Catharine Guiles from material distributed by Jack Schieber, of the DVFWS, to whom she is very grateful for his revisions and corrections.

Adiantum pedatum
Asplenium bradleyi (platyneuron x *montanum)* - NJ
Asplenium montanum - NJ
Asplenium pinnatifidum (rhizophyllum x *montanum)* - NJ
Asplenium platyneuron
Asplenium rhizophyllum - NJ
Asplenium ruta-muraria - NJ
Asplenium trichomanes
A. x *ebenoides (rhizophyllum* x *platyneuron)* - NJ
Athyrium filix-femina var. *angustum*
Azolla caroliniana - NJ
Botrychium dissectum forma dissectum
Botrychium dissectum forma obliquum
Botrychium lanceolatum - NJ
Botrychium matricariifolium - NJ
Botrychium multifidum - NJ
Botrychium oneidense - NJ
Botrychium simplex - NJ
Botrychium virginianum
Cheilanthes lanosa - NJ
Cystopteris bulbifera
Cystopteris fragilis - PA
Cystopteris protrusa - NJ
Cystopteris tenuis
Dennstaedtia punctilobula
Deparia acrostichoides
Diplazium pycnocarpon - NJ
Dryopteris intermedia
Dryopteris carthusiana - NJ
Dryopteris cristata
Dryopteris goldiana - NJ
Dryopteris marginalis
Dryopteris clintoniana (cristata x *goldiana)* - NJ
D. x *benedictii (clintoniana* x *carthusiana)* - NJ
D. x *bootii (cristata* x *intermedia)* - NJ
D. x *dowellii (clintoniana* x *intermedia)* - NJ
D. x *neo-wherryi (goldiana* x *marginalis)* - NJ
D. x *slossonae (cristata* x *marginalis)* - NJ
D. x *triploidea (carthusiana* x *intermedia)* - NJ
D. x *uliginosa (cristata* x *carthusiana)* - NJ
D. x *clintoniana* x *cristata* - NJ
D. x *clintoniana* x *goldiana* - NJ
D. clintoniana x *marginalis* - NJ
Gymnocarpium dryopteris - PA
Isoetes echinospora - PA
Lycopodium alopecuroides - NJ
Lycopodium annotinum - PA
Lycopodium clavatum
Lycopodium lucidulum

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Lycopodium obscurum
Lycopodium diphasiastrum tristachyum - PA
Lycopodium diphasiastrum digitatum
Lygodium palmatum
Matteuccia struthiopteris
Onoclea sensibilis
Ophioglossum vulgatum - NJ
Osmunda cinnamomea
Osmunda claytoniana
Osmunda regalis - NJ
Pellaea atropurpurea - NJ
Pellaea glabella
Phegopteris connectilis
Phegopteris hexagonoptera
Polypodium appalachianum
Polypodium virginianum - PA
Polypodium x *virginianum* x *appalachianum* - PA
Polystichum acrostichoides
Polystichum braunii - PA
Polystichum x *potteri (braunii* x *acrostichoides)* - PA
Pteridium aquilinum var. *latiusculum*
Schizaea pusilla - NJ
Selaginella apoda - NJ
Thelypteris noveboracensis
Thelypteris palustris
Thelypteris simulata
Woodsia ilvensis
Woodsia obtusa
Woodwardia areolata - NJ
Woodwardia virginica - NJ

Ferns in Wisconsin

Sue Hollis - Kansas City, MO

Muir Park Field Trip

Saturday started badly when I arrived for the Saturday AFS fern trip a few minutes after the bus left. However, I was offered an alternative trip – Walking in the Footsteps of John Muir, led by Mark Martin of Wisconsin Department of Natural Resources.

Our first stop was at the Rocky Run Oak Opening State Natural Area in Columbia County. This area was originally an oak savanna cut by a deep canyon, which is now being restored by cutting eastern red cedar and controlled burning. Mark was very knowledgeable about biomes and management techniques. We enjoyed seeing several habitat types in a limited area with many species of plants. *Equisetum hyemale,* scouring rush, was the only ferny friend found there.

Our next stop was at Observatory Woods State Natural Area in Marquette County. Several high school students from New Jersey joined us in a hike up Observatory Hill, which was a favorite haunt of teenage John Muir. The hill is rhyolite where we saw glacial striations, petroglyphs and a fine view for many miles around. The flora ranged from woodland at the bottom of the hill to xeric at the top. From the bottom up, we saw *Dryopteris carthusiana* (spinulose wood fern), *Pteridium aquilinum* (bracken), *D. marginalis* (marginal shield fern), *Polypodium virginianum* (rock cap fern) with *Selaginella rupestris* (rock spike moss) at the top.

Next, we visited Muir Memorial Park State Natural Area three miles away which was part of the Muir homestead where John grew up. We walked/waded/squished through a large alkaline, sedge-grass fen. Much of the very rich flora was blooming and very colorful. Underfoot and almost hidden, were a number of ferns: *Thelypteris novaboracensis* (New York fern), *T. palustris* (marsh fern), *Onoclea sensibilis* (sensitive fern), *Pteridium aquilinum* (bracken), *Osmunda regalis* (royal fern), *Equisetum arvense* (common horsetail), and *Athyrium filix-femina* var. *angustum* (northern lady fern).

A last stop at Dairy Queen ended a very pleasant day.

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